

Homework 12

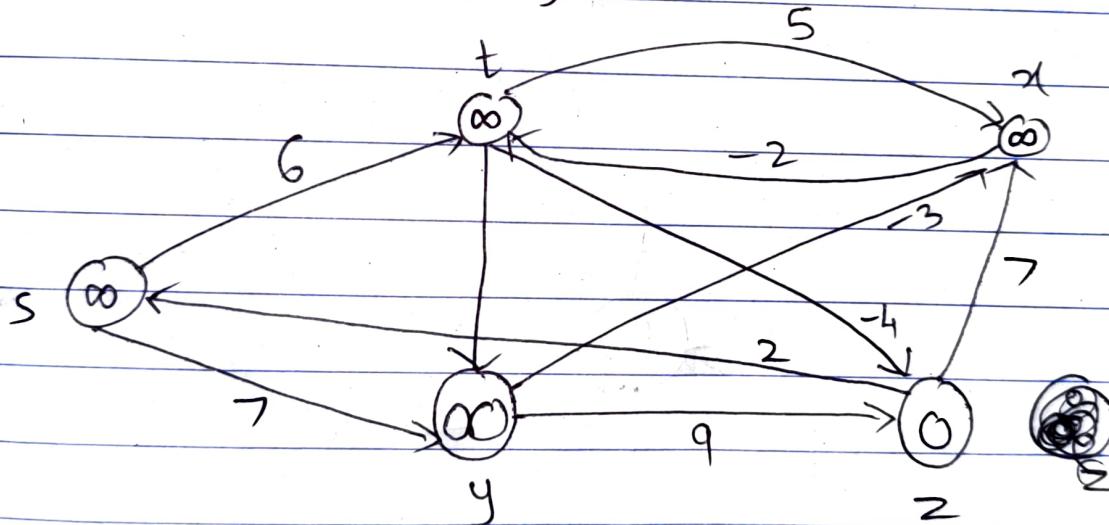
Q1 CLRS Exercise 24.1-1



List of all edges $\rightarrow (t, x), (t, y), (t, z), (x, t), (y, x), (y, z), (z, x), (z, s), (s, t), (s, y)$

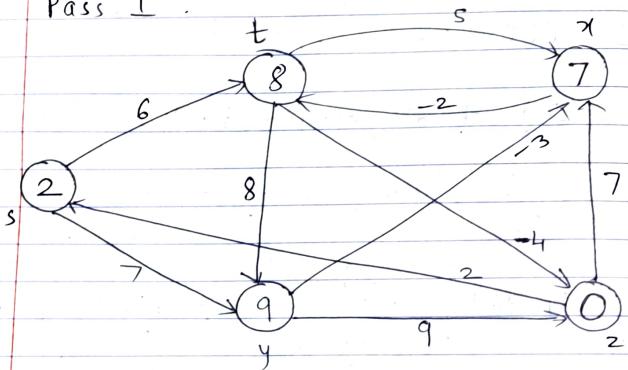
\nearrow (source)

Initially, $d(z) = 0$ and remaining all will be infinity.

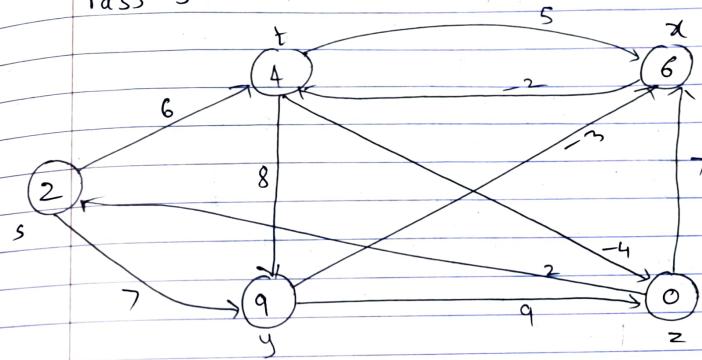


Now we relax each edge 4 times in the same given order.

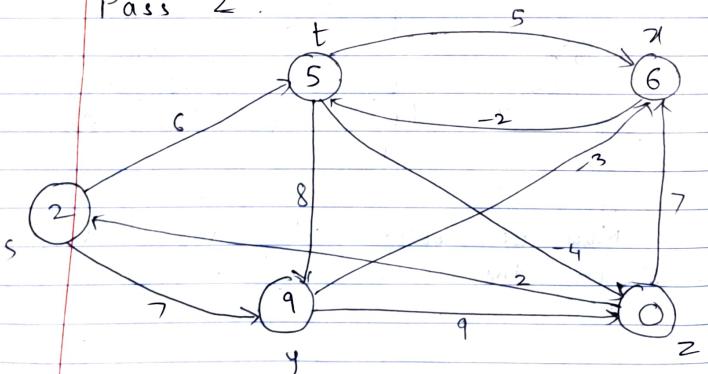
Pass 1 :



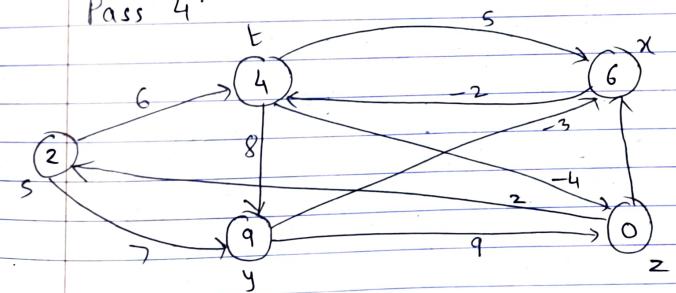
Pass 3 :



Pass 2 :

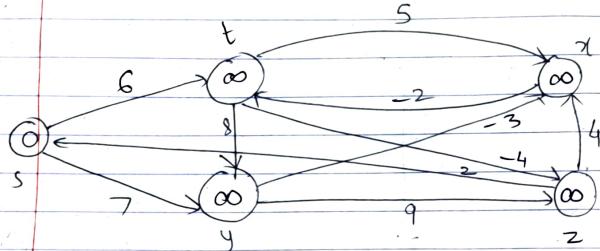


Pass 4 :

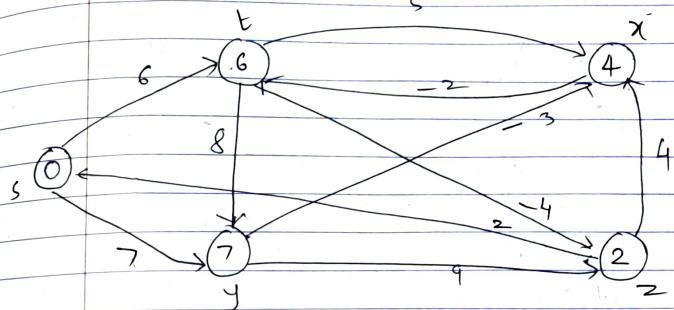


d	s	t	x	y	z	NIL
π	2	4	6	9	0	

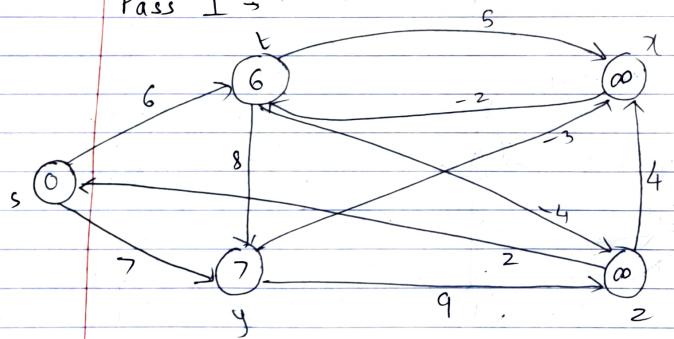
Now with $c(2, x) = 4$, and source s



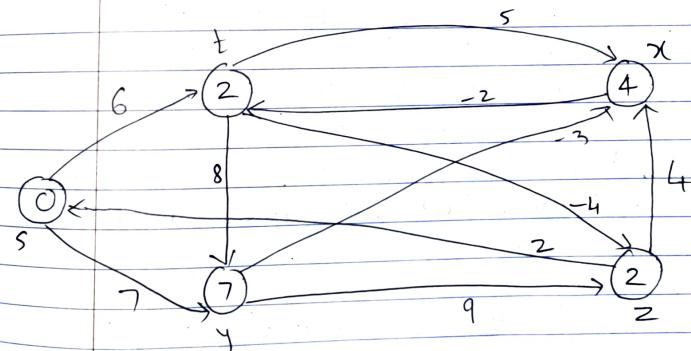
Pass 2:

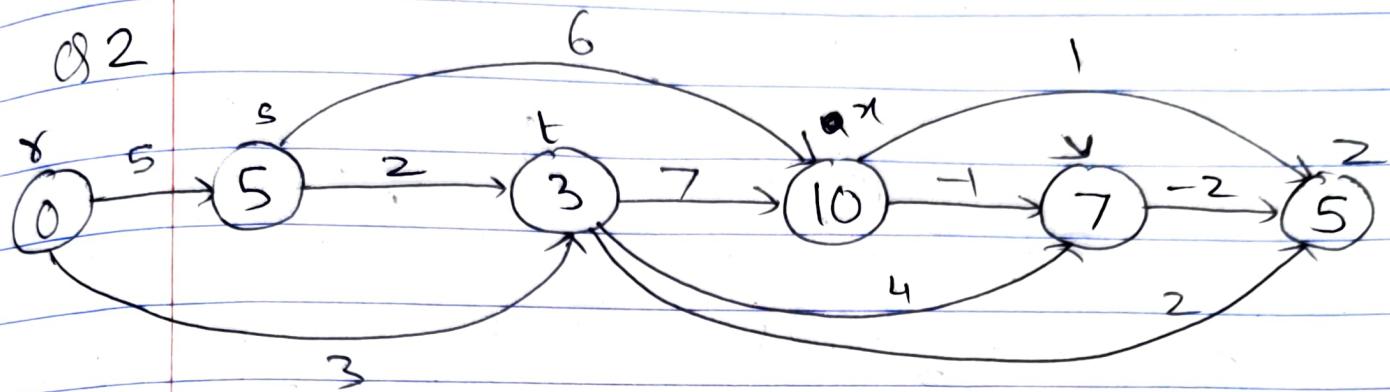


Pass 1 →



Pass 3:





d-table

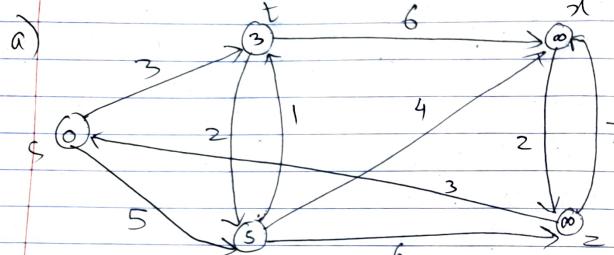
	γ	s	t	x	y	z
γ	0	∞	∞	∞	∞	∞
γ	0	5	3	∞	∞	∞
s	0	5	3 ²	11 ⁶	∞	∞
t	0	5	3	10	7 ⁸	5
x	0	5	3	10	7 ⁹	5

γ -values

	γ	s	t	x	y	z
NIL	γ	γ	γ	t	t	t

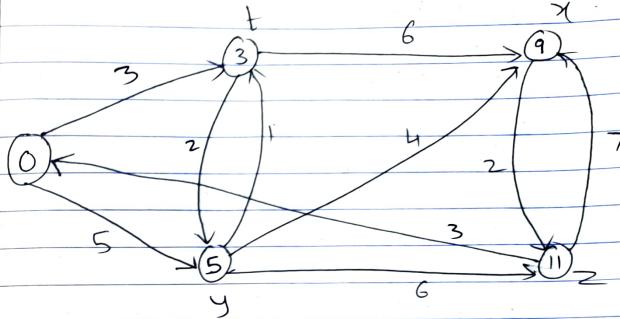
3.

Source 's'



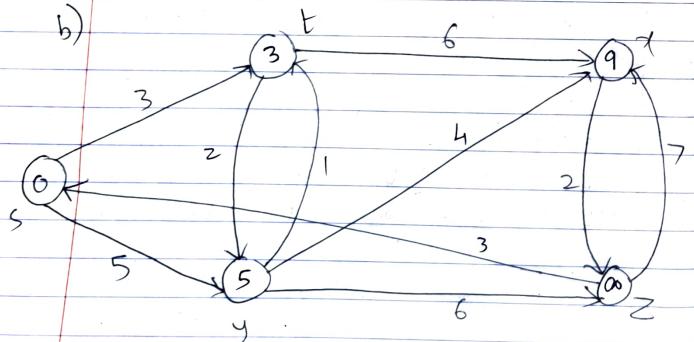
$$S = \{s\}$$

c)



$$S = \{s, t, y\}$$

d)



$$S = \{s, t\}$$

$$S = \{s, t, y, x\}$$

\therefore Path

$$= s \rightarrow t \rightarrow y \rightarrow x \rightarrow z$$

dvalues

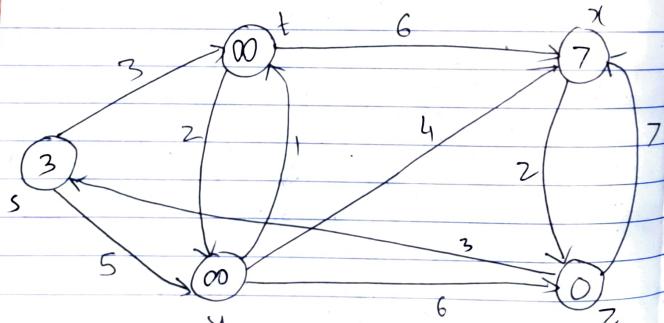
s	t	x	y	z
0	3	9	5	11

w values

s	t	x	y	z
NIL	s	y	t	x

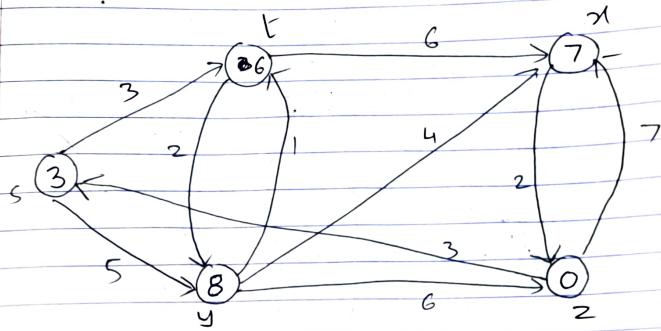
Now, new source 'z'

a)



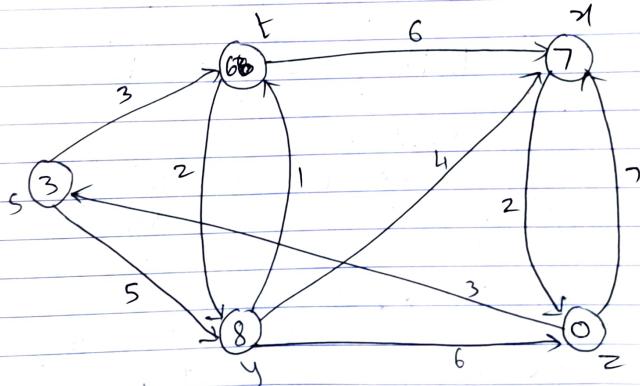
$$s = \{z\}$$

b)



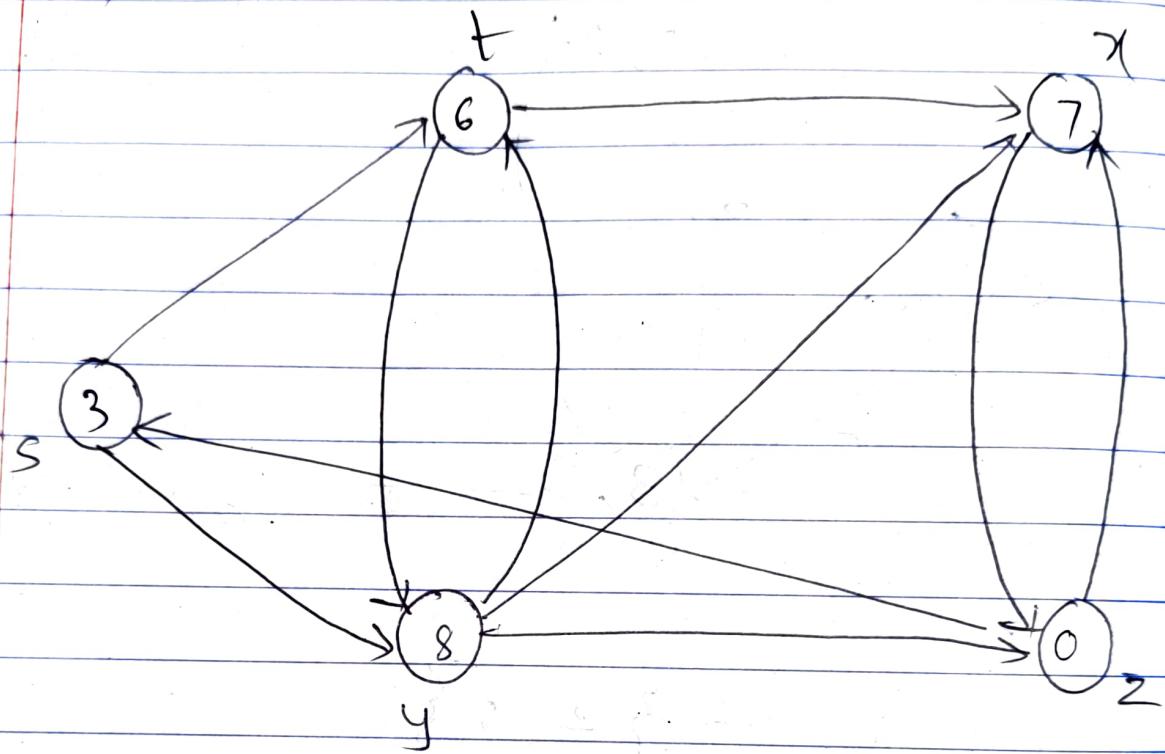
$$s = \{z, s\}$$

c)



$$s = \{z, s, t\}$$

d)



$$S = \{ z, s, t, x \}$$

∴ Path $\Rightarrow z \rightarrow s \rightarrow t \rightarrow x \rightarrow y$

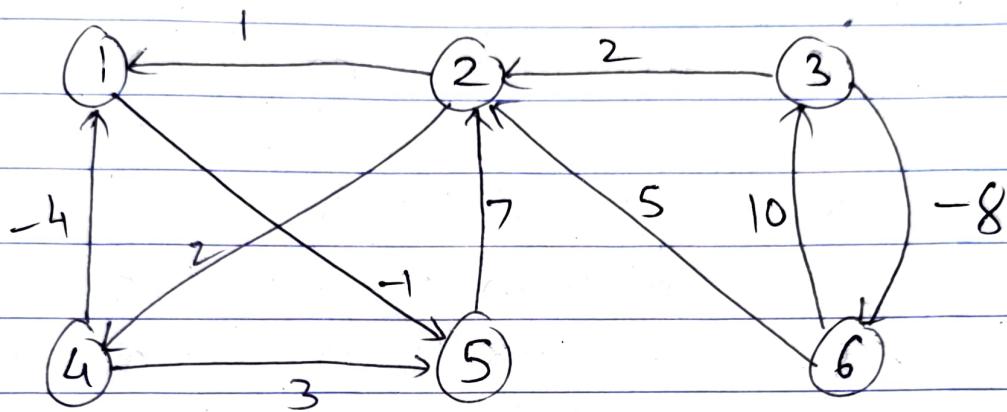
d values

	s	t	x	y	z
distances \rightarrow	3	6	7	8	0

π values

	s	t	x	y	z
π values \rightarrow	z	s	t	x	NIL

Q4



$D^{(k)}$ matrices \rightarrow

$k=1$

0	∞	∞	∞	-1	∞
1	0	∞	2	0	∞
∞	2	0	∞	∞	-8
-4	∞	∞	0	-5	∞
∞	7	∞	∞	0	∞
∞	5	10	0	∞	0

$k = 2 \Rightarrow$

0	∞	∞	∞	-1	∞
1	0	∞	2	0	∞
3	2	0	4	2	-8
-4	∞	∞	0	-5	∞
8	7	∞	9	0	∞
6	5	10	7	5	0

$k = 4 \Rightarrow$

0	∞	∞	∞	-1	∞
-2	0	∞	2	-3	∞
0	2	0	4	-1	-8
-4	∞	∞	0	-5	∞
5	7	∞	9	0	∞
3	5	10	7	2	0

$k = 3 \Rightarrow$

0	∞	∞	∞	-1	∞
1	0	∞	2	0	∞
3	2	0	4	2	-8
-4	∞	∞	0	-5	∞
8	7	∞	9	0	∞
6	5	10	7	5	0

$k = 5 \Rightarrow$

0	6	∞	8	-1	∞
-2	0	∞	2	-3	∞
0	2	0	4	-1	-8
-4	2	∞	0	-5	∞
5	7	∞	9	0	∞
3	5	10	7	2	0

$k = 6$

0	6	∞	∞	8	-1	∞
-2	6	∞	∞	2	-3	∞
-5	-3	0	0	-1	-6	-8
-4	2	∞	∞	0	-5	∞
5	7	∞	9	0	∞	
3	5	10	7	2	0	